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ABSTRACT

The value of proctor written feedback on college students' graded quizzes in a Personalized System of Instruction (PSI) was investigated. In Experiment I, the amount of time 67 students reviewed their graded quizzes was determined. Results indicated that 63% of the students did not review their graded quizzes, suggesting students do not use the corrective written feedback provided on graded quizzes. In Experiment II, the effects of written corrective feedback versus scored feedback in terms of student performance were evaluated. The students in the experimental group received written and scored (points only) feedback on their graded quizzes before proceeding to the next targeted quiz. Probe quizzes were given to both groups. Results indicated that students in the control groups spent the same amount of time observing their graded quizzes as did the experimental group, suggesting that proctor written feedback was more effective than scored written feedback for enhancing student performance in this PSI course. (Author)

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The Effects of Written Corrective Feedback on Graded Quizzes for Students in a Personalized System of Instruction

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Running head: Written Feedback on Graded Quizzes

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The Effects of Written Corrective Feedback on Graded Quizzes for Students in a Personalized System of Instruction

The term "feedback" was introduced to psychology ten years ago (Azrin, Rubin, O'Brien, Allon, & Roll, 1968). Leitenberg, Thompson, and Wright (1968) referred to feedback as "information provided to the patient about his performance." Others described the term as "informative feedback" (Fink & Carnine, 1975), "factual feedback" (Cooper, Thompson, & Baer, 1970), and "knowledge of results" (Hersen & Barlow, 1976). Basically, feedback described a procedure that provided information to a subject about his or her behavior. In the present study, "feedback" refers to written corrective comments on graded quizzes. The written feedback explains discrepancies of the incorrect answers to quiz items of students in a Personalized System of Instruction (PSI).

In PSI, as well as traditional courses, students receive corrective written feedback on graded quizzes or assignments. Salzberg, Wheeler, Devar, and Hopkins (1971) measured the effects of feedback in improving printing skills of kindergarten pupils. The teacher graded printing assignments turned in by students. According to the authors:

> Once the paper was graded, the teacher showed the child how many mistakes and the nature of each mistake he had made. An attempt was made to keep this feedback affectively neutral. The teacher never

used words such as 'good,' 'nice,' 'bad,' or 'poor.' She made descriptive, factual statements, such as: 'You got four wrong. Your lines crossed the lines here and here, and went out of the box there and there.'

Salzberg et al. (1971) found feedback totally ineffective for improving the children's printing skills. The authors attributed the outcome of the results to the teacher's words. More precisely, their feedback statements failed to function as conditioning reinforcers or punishers. Salzberg et al. (1971) stated:

> Perhaps the teacher or researcher should not be surprised by an effect or lack of effect produced by feedback or knowledge of results. If feedback is effective as a reinforcer, it is clearly a conditioned reinforcer. The effectiveness of conditioned reinforcers to maintain or develop behaviors is apparently dependent upon the conditioning procedure of the organism (Kelleher, 1966). The kindergarten children in the present study had limited academic histories, allowing for few pairings of feedback with other reinforcers.

Austin (1976) attempted to determine the effects of writing corrective feedback on math homework assignments. The author had the students' assignments graded and accompanied with written feedback which explained the discrepancies of the incorrect items. He measured the effects of this corrective feedback by the differential responding to questions

on the students' exam scores. The results of this study showed that written corrective feedback increased exam scores in only two of the nine math courses. Austin attributed the outcome to the fact that these two courses were geometry courses which made written comments more useful than simple correct or incorrect markings.

The use of feedback is one component of the teaching methodology adopted by users of PSI courses. Because PSI proves superior to more traditional formats (Born, Glendhill, & Davis, 1972; McMichael & Corey, 1969; Sheppard & MacDermont, 1970; Hursh, 1968), educators often assume each component of PSI enhances student performance. Although substantial data demonstrate the ineffectiveness of some PSI components (cf. Williams, 1976; Hursh, 1976; Calhoun, 1976; Fernald, Chiseri, Lawson, Scroggs, & Riddell, 1975), most educators would generally agree that the use of written corrective feedback on graded quizzes would enhance student performance. However, educators need to examine if written corrective feedback in PSI enhances student performance. As little consensus has been reached validating the results of enhanced student performance, and if written corrective feedback procedures are ineffective, alternative procedures may save costs in terms of time and effort and provide benefits superior to those of present procedures.

EXPERIMENT I: FALL of 1977

The purpose of this study was to determine whether students in PSI use the corrective written feedback on their graded quizzes. The corrective feedback was intended to enhance student performance. The proctor time spent writing, however, would be wasted if students do not read the feedback and no measurement could be obtained evaluating its effects. This was a descriptive study measuring the amount of time students observed their graded quizzes.

Method

Subjects and Courses: Subjects were students enrolled in the Student Centered Education Project (SCEP). SCEP is an accelerated undergraduate psychology course teaching four courses a semester. Students in SCEP I take Psychology 151: Introduction to Applied Behavior Analysis for the first 7½ weeks and then Psychology 161: Analysis of Child Behavior for the next 7½ weeks. Students in SCEP II take Psychology 351: Applied Behavior Analysis for the first 7½ weeks and Psychology 251: Analysis of Abnormal Behavior for the remaining weeks. Western Michigan University required students to take all four of these courses to receive either a Bachelor of Arts or Sciences in the Human Services Program. There were 51 students in SCEP I; all participated in the study.

Setting: SCEP is an experimental program for students and staff which resembles popular PSI courses (Keller, 1968; Sherman, 1976). Graduate and undergraduate assistants were directly

responsible for the supervision of the course. Teaching Apprentices (TAs) conducted the daily activities of the course.

The students use four separate classrooms. The rooms consist of a study room in which students ask questions and review course material; a quiz room in which students take daily quizzes; a grading room where TAs grade quizzes; and a hallway where TAs show students their graded quizzes and post the quiz scores on the hall chart. We used study objectives to end the "guessing game" between students and staff about concepts to be covered by the quizzes. TAs grade quizzes daily and write corrective feedback on the quizzes, providing informative feedback for the students over the incorrect items. To complete the course material, students had to take one unit a day. In addition, they had to meet assigned target dates for quiz completion or forfeit their points for that particular quiz. SCEP is a modified PSI as it uses target dates.

Procedure: The authors selected two advanced students to record the amount of time (duration recording) other students observed the written corrective feedback on graded quizzes. The recordings began when a TA handed a graded quiz to the student and ended when the student returned the quiz to the grader. Each day the observers recorded for a one-half hour interval during a 2-hour block. The actual number of students observed varied from day to day because students took quizzes at different times during the 2-hour

block. The students were unaware that the observer collected data on the observation of written corrective feedback. Two independent observers took reliability on the time recordings during one session a week.

We used a Type One reliability procedure to assess duration recordings $\frac{\text{Agreements}}{\text{Agreements + Disagreements}} \times 100 =$ % reliability. This calculation yielded 100%.

At the end of the study, we gave the students a questionnaire covering various aspects of students' observation of their graded quizzes.

Results and Discussion

The results suggest a large proportion of students did not use the written feedback. Over a period of 4-weeks, 64% of the students did not observe the corrective written feed-

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Insert Fig. 1 about here

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back on their quizzes. Figure 1 shows that 23% of the students observed their quizzes longer than 15-seconds and 15% observed the quizzes between 1 and 15-seconds.

In summary, very few students took advantage of the written corrective feedback provided for them on the quizzes. A possible explanation is that usually students observed their graded quizzes in the quiz room after recording was completed. Students take their quizzes, give them to the TA graders and observe the graded quizzes in the quiz room on the following day. However, students rarely observed their quizzes in the

quiz room. One question on the questionnaire asked, "Did you observe the corrective written feedback on the graded quizzes most often in the hall or in the quiz room?" Only 18% of the students responded "quiz room."

Because students were not required to master or remediate quizzes, they may have been more concerned with the total score received on the graded quizzes, easily accessible on the hall chart, than with the written feedback. Another question from the questionnaire stated, "Did you observe your graded quiz score more often on the hall chart or on your graded quiz?" and 82% of the students responded "on the hall chart."

The results indicate that students were not using the written corrective feedback. Based on these results and data showing written corrective feedback can enhance student performance, we implemented a second experiment.

EXPERIMENT II: WINTER of 1978

The primary purpose of this second experiment was to evaluate the effects of written corrective feedback versus scored (points only) feedback on graded quizzes. A requirement of student observation of graded quizzes was implemented, because the previous semester's data indicated little observation of written feedback. All students in this experiment were required to observe their graded quizzes before proceeding to another unit of material.

Method

Subjects and Courses: The subjects were 14 students enrolled in the Student Centered Education Project (refer to Experiment I for a description of course and personnel).

Setting: The setting in Experiment II is identical to the setting described in Experiment I.

Procedure: I divided the students randomly into two groups. Students were ranked in matched pairs according to an introductory psychology course point total--on which their final grades were based--and divided into groups on a flip of a coin. The experimental group received written corrective feedback on their quizzes. The control group received scored feedback (i.e., +0 for wrong, +2 for right, and the total points received for the quiz). The TAs, or I, asked the students to record the amount of time (duration recording) they observed the written corrective feedback or scored feedback, depending on the group they were in, provided on the graded quizzes. The hall or study room TA gave the students a stopwatch, depending on where the students observed their graded quizzes. The recordings began when a TA handed a graded quiz to the student and ended when he or she returned the quiz to the appropriate TA. The students indicated at the top of the quiz the amount of time they observed the quiz along with their initials. Students were not able to take another quiz until they initialed their previous graded quiz. If a student desired to take another targeted quiz, he or she

could do so provided an "X" was beside his or her previous day's score. The absence of an "X" beside the student's score required the TA to pull the appropriate graded quiz from the file. The TA then handed the student a stopwatch along with the graded quiz. After the TA recorded the amount of time and the initials on the graded quiz, the student proceeded to the next targeted quiz.

Students received a quiz containing probe questions he or she missed on initial graded quizzes. The probe quizzes covered only those quizzes completed during the week between the last probe quiz taken to the next probe quiz. We presented quizzes once a week during seminar. We gave two kinds of probe questions: (1) Probe questions covering word for word questions the student specifically missed and (2) probe questions covering word for word questions scored correct. The latter questions were designed to prevent students from knowing that missed quiz items were being measured.

We conducted reliability on grading for probe questions. The experimenter regraded quizzes three weeks out of five. A Type One assessed grading accuracy.

$$\frac{\text{Agreements}}{\text{Agreements + Disagreements}} \times 100,$$ which yielded 96% reliability.

Results and Discussion

No difference in correct responding to probe items occurred between the experimental (written feedback) group and the control group. Both groups received a total of five probe quizzes. The experimental group answered a total of 99 probe questions and the control group answered 106.

Insert Fig. 2 about here

Figure 2 shows 4 out of 7 matched pairs scored higher in the control condition. The differences between matched pairs ranged from 1% for matched pair #1 to 35% for matched pair #5. However, each group scored 55% correct responding to the total probe items.

In summary, students scored the same in overall correct responding to probe items. Several explanations are possible. We collected data to determine the amount of time each group spent looking over their quizzes with TAs. Both experimental and control groups spend approximately the same amount of time looking over the quizzes. These data indicate that verbal interactions between TAs and students--discussion of correct answers--may influence the students' later responding on probe items.

Another confounding variable was that we informed students we would give them bonus points according to their performance on probe items. We differentially reinforced both groups for correct responding to previously missed items, thus decreasing any differences between groups. For instance, a student needing bonus points to raise his or her grade may increase the amount of study time spent preparing for the quiz.

Further research in this area should control for possible verbal interactions between students and TAs. Researchers should eliminate all feedback, other than that prescribed by the researchers. Also, researchers should not differentially

reinforce students for correct responding to probe items. Researchers should award students bonus points only for attempting to answer each probe item.

Although the results of this study are not conclusive, PSI instructors should consider how TAs can best spend their time. TA time may be used ineffectively in providing written feedback, when in fact, verbal interactions between TA and student are equally effective. At present, neither verbal nor written feedback on quizzes has documented effectiveness.

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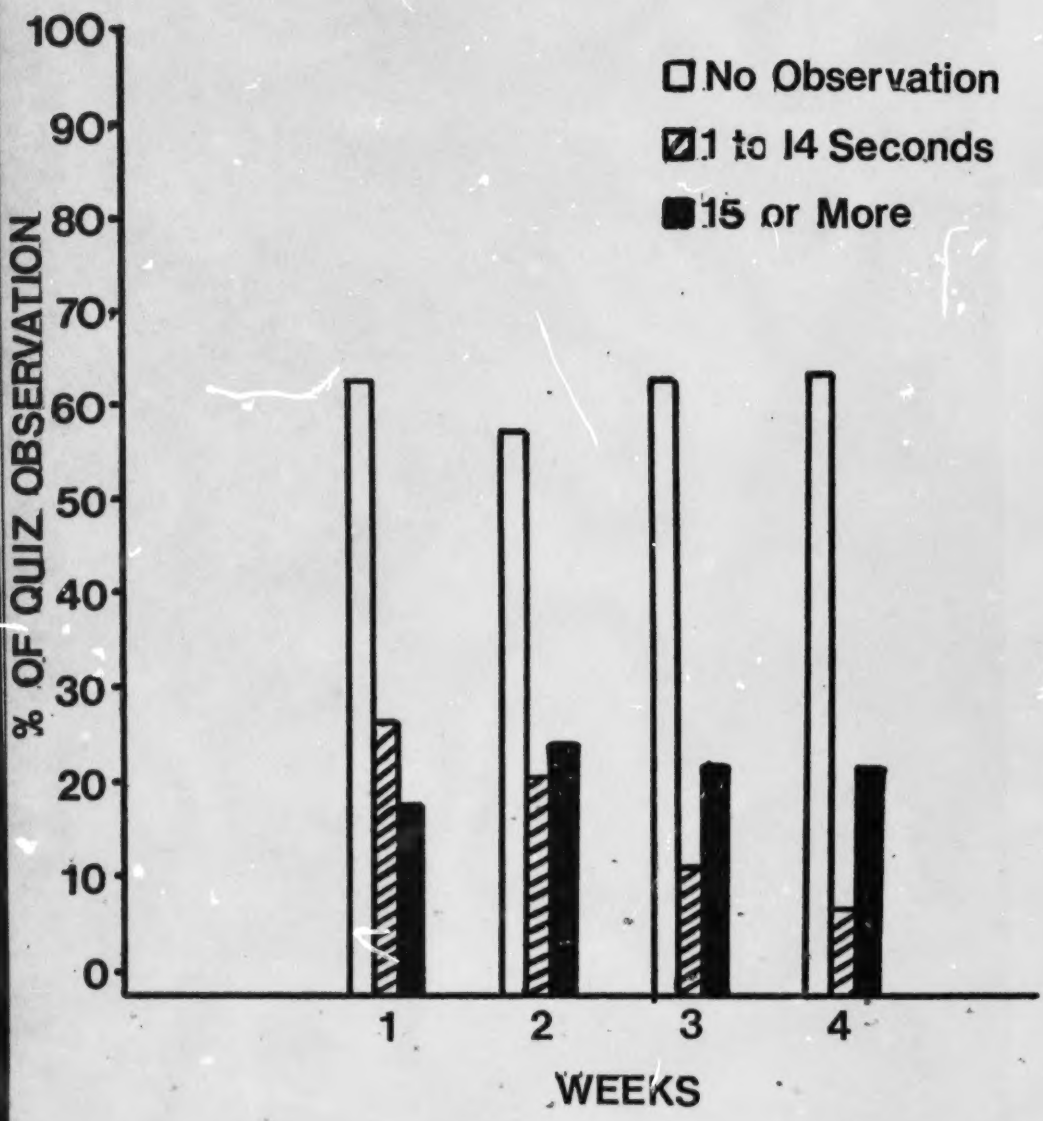
Figure 1. Weekly percent of graded quiz observation.


100
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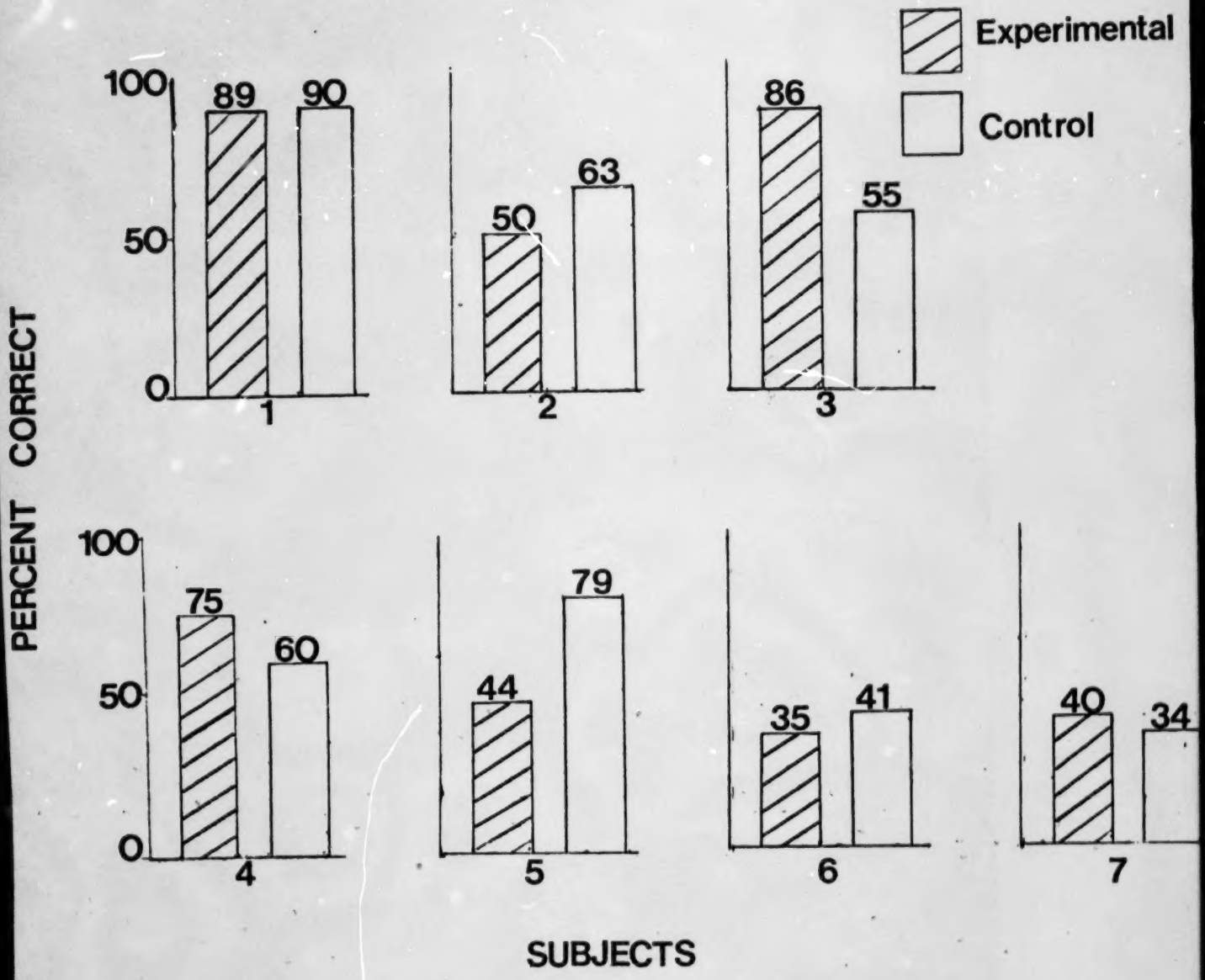
Experimental
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7
SUBJECTS

The Effects of Written Corrective Feedback on Graded Quizzes for Students in a Personalized System of Instruction

Figure 2. Percent correct responding to probe questions between randomly selected matched pairs 1-7.